Whilst the frequency separating stages using their frequency shifting complex converters may separate out particular target bandwidth portions of the input to the system, the requirement to provide a hardware efficient system will to some degree restrict the points about which separated bands may be centred and the widths of those bands such that in preferred embodiments it is advantageous to provide that output signals are passed through respective fine tuning stages that serve to extract the target carrier signals.

Such fine tuning stages may be provided with relatively long delay lines used as filters that may more flexibly tune to a particular frequency and with a particular frequency response as required by the target carrier signal being extracted.

Viewed from another aspect the present invention provides a method of frequency content separating an input signal, said apparatus comprising the step of:

frequency separating a complex input signal representing an input bandwidth extending from –Fs/2 to +Fs/2 to output a frequency shifted complex output signal representing a portion of said input bandwidth, wherein said frequency shifted complex output signal represents a portion of said input bandwidth centred other than at –Fs/4 or +Fs/4.

The invention also provides a method of selecting operating characteristics of a plurality of frequency separating stages as set out in the accompanying claims.

Example embodiments will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a block diagram of a frequency separating tree system;

Figure 2 schematically illustrates frequency band splitting;

Figure 3 is a block diagram of a complex down-converter (CDC);

5. Apparatus as claimed in any one of the preceding claims, wherein said tuned frequency shifting complex converter includes a local oscillator operable to generate one or more time varying coefficient signals by which sample values forming said input signal are multiplied as part of frequency separation.

6. Apparatus as claimed in claim 5, wherein said local oscillator is operable to generate a selectable one of a plurality of different streams of time varying coefficient signals each corresponding to a different local oscillator frequency and operable to separate a different portion of said input bandwidth.

7. Apparatus as claimed in any one of the preceding claims, wherein said tuned frequency shifting complex converter is one of:

a tuned complex up-converter; and

a tuned complex down-converter.

8. Apparatus as claimed in any one of the preceding claims, wherein one or more of said plurality of frequency separating stages includes a complex up-converter and a complex down-converter pair that together are operable to separate a complex input signal into an upper frequency portion and a lower frequency portion being substantially contiguous and of equal size.

9. Apparatus as claimed in claim 3, wherein said plurality of output signals are passed through respective fine tuning stages that serve to extract said target carrier signals.

10. A method of frequency content separating an input signal, said apparatus comprising the step of:

frequency separating a complex input signal representing an input bandwidth extending from –Fs/2 to +Fs/2 to output a frequency shifted complex output signal representing a portion of said input bandwidth, wherein said frequency shifted

complex output signal represents a portion of said input bandwidth centred other than at –Fs/4 or +Fs/4.

11. A method selecting operating characteristics of a plurality of frequency separating stages within an apparatus as claimed in any one of claims 1 to 9, said method comprising the steps of:

determining whether two target signals require extracting from any final frequency separating stage, and if so providing two fine tuning elements for those final frequency separating stages;

determining a number of frequency separating stages required to separate all target signals;

generating local oscillator coefficient values for each frequency separating stage;

generating fine-tuning local oscillator coefficient values for any fine tuning elements within final frequency separating stages; and

selecting a band shaping filter to be applied to each target signal.